# DESCRIPTIONS OF THE PUPAE OF SIX SPECIES OF ARMIGERES THEOBALD, SUBGENUS LEICESTERIA THEOBALD (DIPTERA: CULICIDAE) FROM NEPAL

RICHARD F. DARSIE, JR.

Florida Medical Entomology Laboratory, University of Florida, 200 9th Street, SE, Vero Beach, FL 32962, U.S.A. (e-mail: rfd@gnv.ifas.ufl.edu).

Abstract.—Descriptions and illustrations of previously unknown pupae of Armigeres (Leicesteria) annulitarsis (Leicester), Ar. (L.) dentatus Barraud, Ar. (L.) dolichocephalus (Leicester), Ar. (L.) inchoatus Barraud, and the partially described Ar. (L.) digitatus (Edwards) and Ar. (L.) magnus (Theobald) are presented. A key for their identification and the recently discovered Ar. (L.) omissus (Edwards) is included.

Key Words: mosquitoes, Culicidae, Armigeres, Leicesteria, pupae, Nepal

Thirteen species in the genus Armigeres Theobald are known from Nepal (Darsie and Pradhan 1990, Darsie et al. 1991, 1992). Six are placed in the subgenus Armigeres Theobald and seven in the subgenus Leicesteria Theobald. The pupae of two species adequately described in the subgenus Armigeres are Ar. kesseli Ramalingam (1987) and Ar. theobaldi Barraud (Toma et al. 1994). I am describing here the pupae of six species in the subgenus Leicesteria, four species whose pupae were unknown, Armigeres annulitarsis (Leicester), Ar. dentatus Barraud, Ar. dolichocephalus (Leicester), and Ar. inchoatus Barraud, and two species partially described by Delfinado (1966) and Baisas (1974), Ar. digitatus (Edwards) and Ar. magnus (Theobald). Recently a seventh species in this subgenus was discovered in our Nepal collection, Armigeres (Leicesteria) omissus (Edwards). Its pupa will be described later; however, it is added to the key.

### METHODS AND MATERIALS

Mosquito specimens used in this study were from several sources. The specimens

from Nepal were collected during three field trips, results of which were reported by Darsie et al. (1991, 1992, 1993, 1994, 1996). Collection methods followed very closely those of Belkin et al. (1965). The majority of the collections were immatures from larval habitats, brought to the field laboratory. A proportion were reared individually to adult and the remainder mass reared, removing adults daily. The Nepal mosquito collection is stored at the Florida Medical Entomology Laboratory, Vero Beach, FL. The second source of material is from the U.S. Armed Forces Institute for Medical Sciences, Bangkok, Thailand. Representative collections made by its staff and employed in this study are deposited in the Walter Reed Biosystematics Unit, National Museum of Natural History, Smithsonian Institution, as were the specimens from the Institute for Medical Research, Malaysia. Nepal collection data is listed by district in upper ease, locality, date, number and sex of the specimens, accompanying larval (Le) and/or pupal (Pe) exuviae, collection site, and in brackets, the collection number, Speeies confirmation was based on identifica-

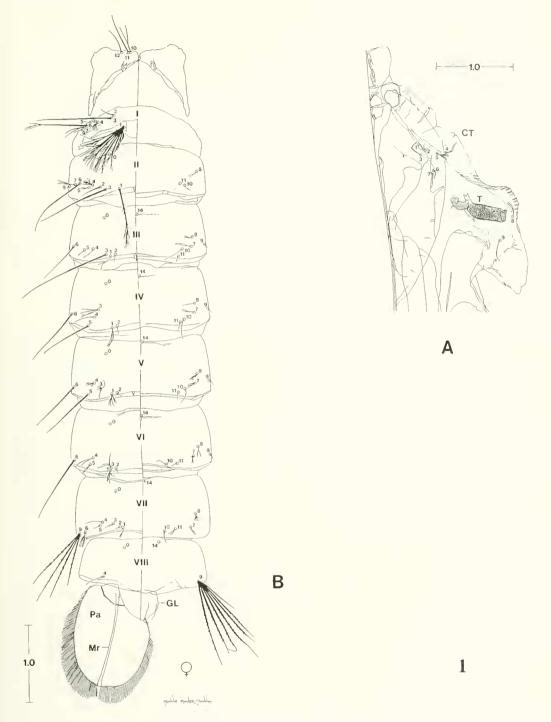


Fig. 1. Pupa of *Armigeres annulitarsis*. A, Cephalothorax. B, Metanotum and abdomen. Abbreviations: BU = paddle buttress; CT = cephalothorax; GL = genital lobe; Mr = paddle midrib; Pa = paddle; T = respiratory trumpet.

Seta	Cephalo-	Abdonunal Segments								
	thorax	I	II	111	IV	V	VI	VII	VIII	
0		_	1	1	1	1	1	1	1	
1	1	5-9(8,9)	1-10(2,3)	2	2-4(4)	3-6(3)	2-5(4)	2-3(2)		
2	$1-3(2)^{1}$		1	I	1	1	1	1	1	
3	1	1	1	)	4-6(5)	2-3(2)	2-4(3)	2-4(2)	_	
4	1-3(2)	4-8(?)	7-10(8)	1-2(2)	1-2(2)	5-7(6)	1-3(2)	1-2(1)	1-30	
5	3-8(4)	1	1-3(2)	1-2(2)	1	1	1-3(1,2)	1-2(1)	_	
6	1	1-4(1)	1	1	1	1	I - 3(1)	2-4(2)	_	
7	1-2(2)	2-4(2)	2-5(3)	2-5(2)	1-4(2)	4-7(6)	2-5(3)	2-3(2)	_	
8	2-3(2)	_	2-3(3)	2-5(3)	1-3(2)	1-3(2)	1-3(2)	4-10(5)	_	
9	1	1	1	1	1	1	1	3-7(4)	5-7(	
10 -	2-4(2)		1-2(1)	1	1	1	1	1-3(2)	_	
11	1	_	1	1	1	1	1	1-2(1)	_	
12	1	_		_	_	_		_	_	
14			_	1	1	1	1	1	1	

Table 1. Pupal chaetotaxy of Armigeres annulitarsis.

tion of associated adults and/or larvae. In the descriptions "b" means branches.

#### DESCRIPTIONS

### Armigeres (Leicesteria) annulitarsis (Leicester) (Fig. 1)

Position and size of setae as figured, range and modal number of branches in Table 1. Cephalothorax: Seta 3-CT much stouter that 1-CT and 2.0 longer; 6-CT rather stout, pale tan, 7-CT about 1.6 longer than 6-CT, single or double; trumpet length 0.43-0.5 mm long, index 2.3-2.5, pinna with small tragus. Abdomen: 1-II pedunculate, sparsely aciculate, usually with 2-3b in outer 0.45-0.61; 3-II stout, very long, 5.5 longer than 2-II; 1-III and 1-IV short, double or with 3, 4b; 1-V-VII at least 1.5 longer than 2-V-VII; 3-III subequal to length of following tergum; 3-IV with 4 to 6b; 6-II-V stout, at least 0.7 length of following tergum, single; 6-VI subequal in thickness to 5-V, usually single; 9-VII stout, aciculate, with 3-7b; 9-VIII stout, aciculate, with 5-7b. Paddle: length 1.30-1.39, index 1.26-1.4, fringe on outer margin extending to near base, fringe length 0.19 mm.

The description is based on the following specimens: Nepal, KASKI, Arghan, near Pokhara on the Prithvi Highway, VII-30-92, 3 ♀ Pe, 1 ♂ Pe, ex bamboo node [331]. Other specimens without accompanying immatures from Nepal are SUNSARI, Dharan, 6 ♀, ex light trap; JHAPA, Kanchanburi, VII-30-91, 1 ♀, reared from pupa, ex bamboo stump [101]; OKALDUNGA, Rumjatar, IX-23-91, 1 ♀, reared from pupa, ex bamboo stump [225].

# Armigeres (Leicesteria) dentatus Barraud (Fig. 2)

Positions and size of setae as figured; range and modal number of branches in Table 2. *Cephalothorax:* Seta 3-CT and 1-CT thin, very long, 1-CT about 1.4 length of 3-CT; 7-CT more than 2.4 length of 6-CT, usually double; trumpet length 0.47–0.57 mm, index 2.4–3.1. *Abdomen:* 1-II with 14-21b from near base; 3-II extremely long, 17.0 longer than 2-II; 1-III with 8-16b; 1-IV with 8-14b; 1-V-VII at least 1.7 length of 2-V-VII; 3-III 1.4 length of following tergum; 6-II-V with thin branches, 0.2–0.4 length of following tergum, single or with 2-5b; 6-VI stouter than 5-V, usually double;

Range followed in parentheses by the mode.

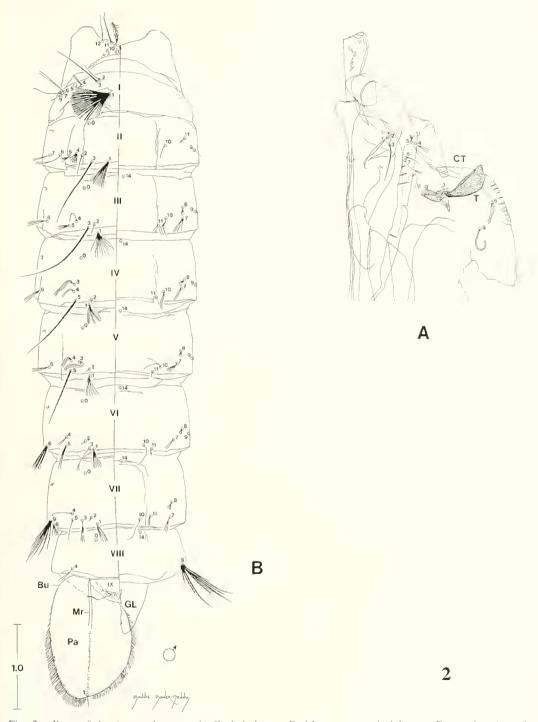


Fig. 2. Pupa of Armigeres dentatus. A, Cephalothorax. B, Metanotum and abdomen. For explanation of abbreviations see Fig. 1.

	Cephalo-	Abdominal Segments									
Seta	thorax	Ţ	II	III	IV	V	VI	VII	VIII		
()	_		1	1	1	1	1	1	1		
1	$1-2(1)^{1}$	14-19(17)	14-21(?)	8-16(11)	8-14(10)	5-8(7)	3-8(4)	1-5(2)			
2	1-2(2)	1	1	1	1	1	1-2(1)	1			
3	1-2(1)	1	1-2(1)	1-2(2)	3-8(4)	1-2(1)	1-2(1)	1-2(2)	1-3(1)		
-1	2-7(2)	2-5(5)	3-7(?)	1-2(2)	1-2(2)	2-5(4)	2-4(3)	1-4(3)			
5	3-5(3)	1-2(1)	1-2(2)	3-8(4)	1-2(1)	1-2(1)	1-2(2)	1-3(1)	_		
6	1	2-6(3)	2-5(3)	3-6(4)	1-4(4)	2-4(3)	1-3(2)	2-5(4)	_		
7	1-3(2)	1-3(2)	2-4(2)	2-5(2)	1-3(2)	3-5(4)	2-3(2)	2-3(2)	_		
8	2-5(4)	_	1-4(3)	2-6(3)	3-5(4)	3-5(4)	1-4(3)	3-6(3)	_		
9	1-2(1)	1	1	1	1	1	1	4-8(5)	6-11(6		
10	4-7(6)	-	1-3(1)	1-4(2)	2-3(2)	1-3(2)	1-2(1)	1-2(2)	_		
1 t	1(1)	_	1-2(1)	1	1-2(1)	1	1-2(1)	1-3(1)	_		
12	1-3(2)			_	2-3(2)	1-3(1)	3-4(4)		_		
14	1				1	1	1	1	1		

Table 2. Pupal chaetotaxy of Armigeres dentatus.

9-VII with 4-8b; 9-VIII with 6-11b. *Paddle:* length 1.34–1.44 mm, index 2.4–3.1, fringe on outer margin in apical 0.65, fringe length 0.10 mm.

The description is based on the following specimens: Thailand, Chiang Mai Province, Doi Pa Car, IV-9-64,  $3 \ \$ Le Pe,  $2 \ \$ Le Pe, ex bamboo stump. Collections of adults of this species in Nepal were made in SUN-SARI, Dharan, IX-84,  $2 \ \$ , IX-85,  $2 \ \$ , ex light trap; JHAPA, Kanchanbari, VIII-2-91,  $4 \ \$ , resting in forest.

## Armigeres (Leicesteria) dolichocephalus (Leicester) (Fig. 3)

Position and size of setae as figured; range and modal number of branches in Table 3. *Cephalothorax:* Seta 1,3-CT with thin branches, single, rarely double; 7-CT about 2.0 length of 6-CT, double or triple, 6-CT dark colored; trumpet length 0.58–0.65 mm, index 1.9–2.3. *Abdomen:* 1-II slightly pedunculate, branched in outer 0.88, with 24-36b; 3-II stout, about 3.0 longer than 2-II; 1-III with 4-11b; 1-IV with 3-13b; 1-V subequal to 2-V, 1-VI-VII 1.4 longer than 2-VI-VII; 6-II-V 0.07–0.15 length of following tergum; 6-VI stouter

than 5-V, usually double; 9-VII with 2-6b; 9-VIII with 2-5b. *Paddle:* with conspicuous lobe apically on outer half, strongly emarginate, length 1.64–1.73 mm, index 1.6–1.76, fringe on apical 0.5 of outer margin, fringe length 0.10 mm.

The description was based on the following specimens: Malaysia, Institute for Medical Research,  $1\ ^{\circ}$  Le Pe (No. 0875/13),  $1\ ^{\circ}$  Le Pe (No. 0875/9), no locality given; Selangor, Ulu Langat, FR., 1970?,  $1\ ^{\circ}$  Le Pe (No. 3552-10). The species is represented in Nepal by adults as follows: SUNSA-RI, Dharan, IX-X-84,  $2\ ^{\circ}$ , ex light trap; KASKI, Pokhara, VII-28-92,  $1\ ^{\circ}$ , ex resting on bamboo; Arghan on Prithvi Highway, VII-31-92,  $2\ ^{\circ}$ . These records represent the first collection of this species in the Indian subcontinent.

# Armigeres (Leicesteria) inchoatus Barraud (Fig. 4)

Positions and size of setae as figured; range and modal number of branches in Table 4. *Cephalothorax:* Seta 1-CT about 1.6 length of 3-CT, both with thin branches; 7-CT at least 2.5 length of 6-CT, usually double; trumpet length 0.43–0.52 mm, index 1.7–2.3. *Abdomen:* Seta 1-II stout, pedun-

<sup>1</sup> Ranges followed in parentheses by modes.

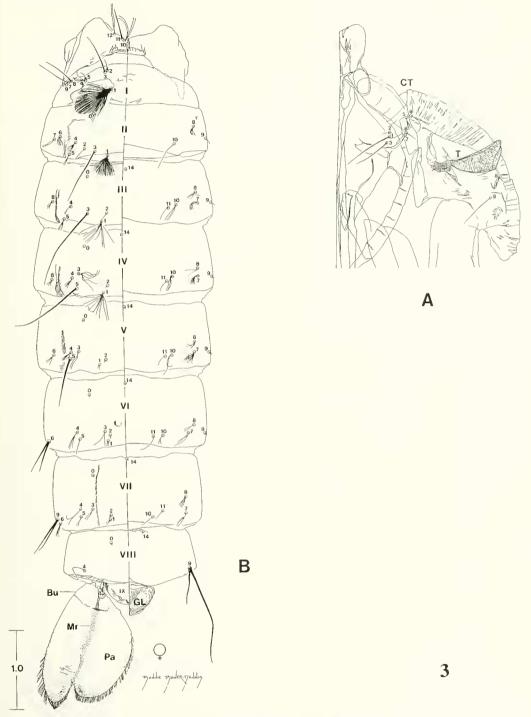


Fig. 3. Pupa of *Armigeres dolichocephalus*. A, Cephalothorax. B, Metanotum and abdomen. For explanation of abbreviations see Fig. 1.

	Cephalo-	Abdominal Segments								
Seta	thorax	I	11	III	IV	V	VI	VII	VIII	
0		_	1	1	1	1	1	1	1	
1	1	15-20(15)	24-36(27)	4-11(4)	3-13(?)	1-5(1)	2-5(2)	1-3(2)	_	
2	$2-4(2)^{1}$	1	1	1	1	1	1	1	_	
3	1-2(1)	1	1	1-3(1)	4-7(5)	2-4(3)	2	2-3(3)	_	
4	3	4-6(6)	4-7(4)	1-3(2)	2-4(3)	3-5(5)	2-5(2)	2-3(2)	1-2(1	
5	4-6(?)	1-2(1)	2-3(2)	3-5(3)	1	1	1	1-2(1)	_	
6	1	1-3(?)	2-6(4)	2-5(3)	3-5(?)	1-4(1)	1-2(2)	3-4(3)	_	
7	2-3(2)	1-2(2)	2-4(3)	3-6(3)	3-5(3)	3-8(?)	1-3(?)	1-3(3)	_	
8	2-4(3)	_	_	2-4(?)	2-4(2)	2-5(3)	2-6(2)	3-6(4)	_	
9	1	1	1	1	1-2(1)	1-2(1)	1	1-6(2)	2-6(3	
10	4-5(4)	_	1-3(1)	2-3(2)	1-4(2)	1-2(2)	1-3(1)	1-2(1)	_	
11	1	_	1-4(1)	1	1	1	I	1-2(1)	_	
12	1-2(1)			_	_	_	_		_	
14	_	_	_	1	1	1	1	1	1	

Table 3. Pupal chaetotaxy of Armigeres dolichocephalus.

culate, brush-like, with 6-16b on outer 0.10–0.25; 3-II about 12.0 longer than 2-II; 1-III with 4-6b, 1-IV with 2-6b; 1-V-VII at least 2.0 length of 2-V-VII; 3-III subequal to length of following tergum; 6-II-V with thin branches, 0.18–0.28 length of following tergum, single or double; 6-VI about as stout as 5-V, single; 9-VII stout, with 2-5b; 9-VIII stout, with 4-8b. *Paddle:* length 1.29–1.65 mm, index 1.48–2.0, fringe on apical 0.6 of outer margin, fringe length 0.05 mm.

The description is based on the following specimens: Nepal, KASKI, Pokhara, Male Patan, VII-28-92, 1 ♀ Le Pe, 3 ♀ Pe, ex bamboo stump [304]; Pokhara, Lamachaur, VII-28-92, 1 ♀ Le Pe, ex treehole [310]; 1 ♀ Le Pe, 5 ♀ P, 2 ♂ Le Pe, 3 ♂ Pe, ex bamboo stump [314]; Tholomani, VIII-25-92, 1 ♀ Pe, 1 ♂ Pe, ex bamboo stump [496].

Armigeres (Leicesteria) digitatus (Edwards) (Fig. 5)

Positions and size as figured; range and modal number of branches in Table 5. *Cephalothorax:* Seta 1-CT and 3-CT, subequal in length, with thin branches, mostly

single or double, rarely triple; 7-CT 1.6 length of dark colored 6-CT, single or double; trumpet length 0.57-0.63 mm, index 2.3-2.9. Abdomen: 1-11 with 28-41b from near base: 3-II about 3.8 longer than 2-II: 1-III with 3-6b; 1-IV with 3-7b; 1-V-VII 2.0 or greater length of 2-V-VII; 6-II,III with thin branches, 0.27-0.45 length of following tergum, mostly single to triple; 6-IV,V with thin branches, 0.11-0.17 length of following tergum, usually double or triple; 6-V1 stouter that 5-V, single or double; 9-VII with 2-4b; 9-VIII with 5-7b. Paddle: length 1.03-1.17 mm; index 1.34-1.48, fringe on outer margin to near base, fringe length 0.13 mm.

The description is based on the following specimens from the U.S. Army SEATO Laboratory, Bangkok, Thailand: Kanchanaburi Province, Ban Tha Thong Mon, IX-12-73, 1 \( \times \) Le Pe, 1 \( \delta \) Le Pe, ex bamboo stump; Nakhonsawa Province, Khao Luang Nua, XI-7-68, 3 \( \delta \) Le Pe, ex bamboo stump. Two adults without associated immatures were collected in Nepal: JHAPA, Kanchanbari, VIII-2-91, 1 \( \delta \), resting outdoors [111]; Sunwari, VIII-5-91, 1 \( \delta \), reared from pupa, ex bamboo stump [115].

<sup>&</sup>lt;sup>1</sup> Range followed in parentheses by mode.

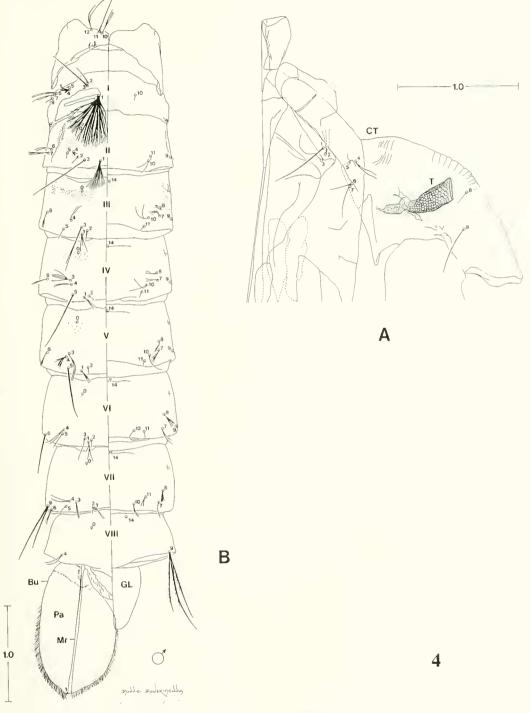


Fig. 4. Pupa of Armigeres inchoatus. A, Cephalothorax. B, Metanotum and abdomen. For explanation of abbreviations see Fig. 1.

14

	Cephalo-	Abdominal Segments								
Seta	thorax	1	11	111	IV	V	VI	VII	VIII	
0	_		1	1	1	1	1	1	1	
1	$1-2(1)^1$	6-12(10)	8-19(?)	3-6(5)	2-6(4)	2-4(2)	2-5(2)	2-3(2)	_	
2	1-3(2)	1	1	1	1	1	1	1	_	
3	1-3(2)	1	1	1-2(1)	3-10(5)	3-6(3)	1-3(2)	1-2(2)	_	
4	2-4(2)	4-7(5)	2-7(5)	1-3(2)	1-2(2)	2-6(5)	2-4(2)	2	1-3(2)	
5	2-5(2)	1	1	1-3(1)	1-2(1)	1	1-2(1)	1-2(1)	_	
6	1	2	1-2(2)	1-2(1)	1-2(2)	1-2(1)	1	1-5(2)		
7	1-2(2)	2	2-5(2)	1-4(2)	1-3(2)	3-7(3)	1-3(3)	1-3(2)	_	
8	1-3(2)	_		1-6(3)	2-5(2)	1-3(2)	2-3(2)	3-9(4)		
9	1-2(1)	1	1	1	1	1	1	2-5(4)	3-8(5)	
10	3-6(4)	1	1-3(2)	2-3(2)	1-4(2)	1-2(1)	1-2(1)	1-4(2)		
1.1	1	_	1	1	1	1	1-2(1)	1-2(1)	_	
12	1-2(1)	_			_		_	_	_	

Table 4. Pupal chaetotaxy of Armigeres inchoatus.

### Armigeres (Leicesteria) magnus (Theobald) (Fig. 6)

Positions and size of setae as figured; range and modal number of branches in Table 6. Cephalothorax: Setae 3-CT much stouter than 1-CT, subequal in length; 6-CT stout, light tan, 0.5 length of 7-CT; trumpet length 0.33-0.6 mm, index 0.2-0.3, Abdomen: 1-11 long, pedunculate, with many long aciculae, single or 2- to 5-branched in distal 0.4-0.7; 3-II 4.0 length of 2-II, very stout; 1-III and 1-IV short, with 2-5 b: 1-V-VII 1.25–1.5 longer than 2-V-VII; 3-IV with 2-4b; 6-II-III stout, single, 0.8 as long as following segment; 6-IV, V rather stout, single, 0.5-0.6 as long as following segment: 6-VI stouter than 5-V, with 1-3b: 9-VII with 3-5b; 9-VIII with 4-8b. Paddle: length 1.19-1.45 mm; index 1.40-1.85, fringe on outer margin extending to near base, fringe length 0.17 mm.

The description is based on the following specimens: Nepal, OKALDUNGA, Rumjatar, Tallo Gaon, IX-21-91, 1 ♀ Le Pe, ex bamboo stump [225]; KASKI, Pokhara, Arghaun, VII-30-92, 1 ♀ Le Pe, ex bamboo stump [331]; Pokhara, Prithvi Highway, VII-31-92, 2 ♀ Le Pe, 1 ♂ Le Pe, ex bamboo stump [341].

### KEY TO THE PUPAE OF THE GENUS ARMIGERES, SUBGENUS LEICESTERIA, FROM NEPAL

	FROM NEPAL	
1.	Paddle fringe extending to near base on outer margin (Figs. 1, 5, 6)	2
-	Paddle fringe on apical 0.75 or less on outer margin (Figs. 2–4)	5
2(1).	Seta 6-II-V short, thin, usually with 2 branches or more (Fig. 5)	3
_	Seta 6-II-V long, stout, single (Figs. 1, 6)	
3(2).	Seta 1-11 with 28 or more branches (Fig. 5)	4
_	Seta 1-11 with 17 or fewer branches omiss	
4(2).	Seta 3-IV usually 5- or 6-branched; seta 1- 11 sparsely aciculate (Fig. 1) annulitar.	civ
-	Seta 3-IV usually with 4 or fewer branches;	
5(1).	seta 1-II densely aciculate (Fig. 6) magn Paddle with large external lobe; seta 1-II	us
	with 24 or more hranches; seta 3-11 3.0 longer than 2-11 (Fig. 3) dolichocephal	us
-	Paddle without large external lobe; seta 1-11 with 21 or fewer branches; seta 3-11 at least	
6(5)	12.0 longer than 2-II (Figs. 2, 4) Seta 3-CT with thin branches, thinner than	6
0(2)	1-CT; seta 6-V1 single; setae 1-111-1V with	
_	6 or fewer branches (Fig. 4) inchoat Setae 1-CT and 3-CT rather stout, subequal	us
	in size; seta 6-VI with 2 or more branches; setae 1-III-IV with 8 or more branches (Fig.	
	2) dentat	us

### ACKNOWLEDGMENTS

The author is indebted to G. W. Courtney and S. P. Pradhan for their cooperation and

Range followed in parentheses by the mode.

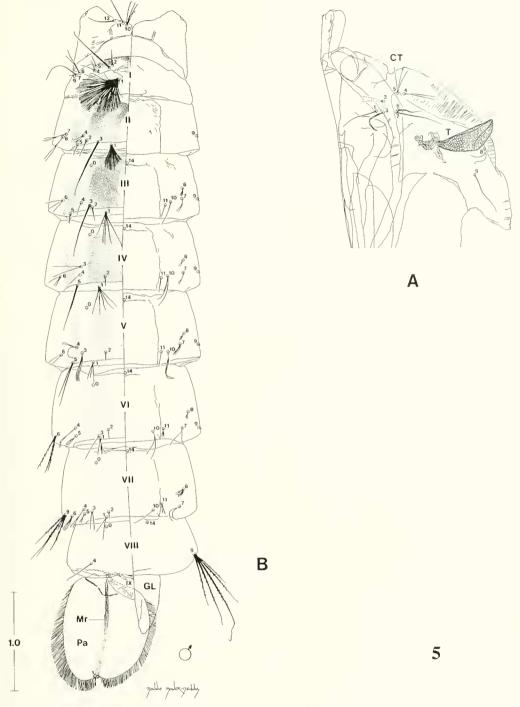


Fig. 5. Pupa of Armigeres digitatus. A, Cephalothorax. B, Metanotum and abdomen. For explanation of abbreviations see Fig. 1.

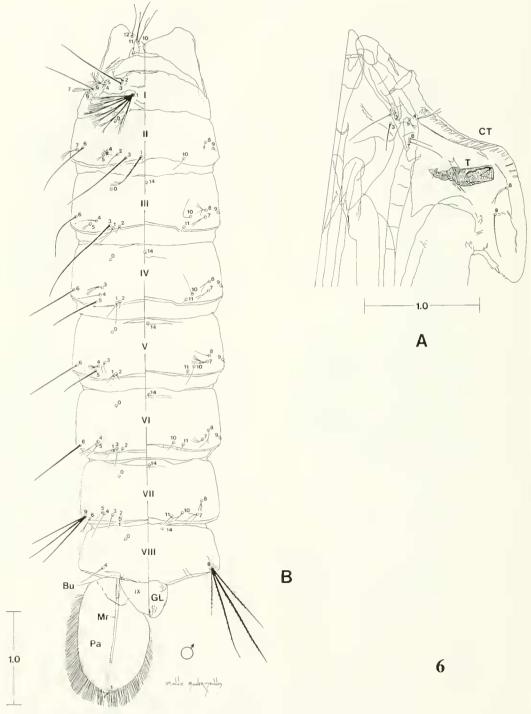


Fig. 6. Pupa of Armigeres magnus. A, Cephalothorax. B, Metanotum and abdomen. For explanation of abbreviations see Fig. 1.

Table 5. Pupal chaetotaxy of Armigeres digitatus.

	Cephalo-	Abdominal Segments								
Seta	thorax	I	II	III	IV	\	VI	VII	VIII	
0		_	1	1	1	1	1	1	1	
1	$1-2(1)^1$	11-21(?)	28-41(?)	3-6(5)	3 - 7(5)	2-4(3)	1-4(2)	1-3(2)		
2	2-3(2)	1(1)	1-2(1)	1	1-2(1)	1-2(1)	1(1)	1		
3	2-3(2)	1-2(1)	1	1-2(1)	2-5(5)	2-3(3)	2-4(3)	2-3(2)		
4	2-5(2)	2-3(2)	2-5(4)	1-3(2)	1-2(1)	3-5(4)	2-3(2)	1-2(2)	1-2(2)	
5	2-4(3)	1	1-2(2)	2-5(2)	1-2(1)	1-5(1)	2 - 8(4)	2-3(2)		
6	1-2(1)	1-3(2)	1-3(2)	2-4(3)	2-5(2)	2-3(2)	1-2(1)	2-4(3)		
7	1-2(1)	1-2(2)	2	2-3(3)	1-3(2)	2-5(3)	2-4(3)	2-3(3)		
8	2-4(3)		2-5(2)	2-4(3)	2-4(3)	2-5(3)	2-4(2)	3-7(6)		
9	]	1	]	1	1	1	1	2-4(4)	5-7(6)	
10	3-5(4)		2-3(2)	1-4(2)	2-3(2)	1-2(2)	1-2(2)	1-2(2)	_	
11	1	_		1-2(1)	1	1	1-3(1)	1-3(2)		
12	1-2(2)						_	_		
14		_	_	1	1	1	1	1	1	

<sup>1</sup> Range followed in parentheses by mode.

encouragement during the Nepal project; to the National Geographic Society for their support of the field and laboratory work and the illustrations; to the Walter Reed Biosystematics Unit, National Museum of Natural History, Smithsonian Institution, for the loan of specimens; to B. Bower-Dennis for preparing the illustrations, and to J. Nayar, J. Rey, G. F. O'Meara and L. P. Lounibos for reviewing parts of the manuscript. This is Florida Agricultural Experiment Station Journal Series No. R-06062.

#### LITERATURE CITED

Baisas, F. E. 1974. The mosquito fauna of Subic Bay Naval Reservation, Republic of the Philippines. U.S. Navy, Headquarters First Medical Service Wing, Technical Report 72-2, 1–170.

Belkin, J. N., R. X. Schick, P. Galindo and T. H. G. Aitken. 1965. Mosquito studies (Diptera, Culicidae) I. A project for a systematic study of the

Table 6. Pupal chaetotaxy of Armigeres magnus.

	Cephalo-	Abdominal Segments									
Seta	thorax	I	II	III	IV	V	VI	VII	VIII		
0	_	_	1	1	1	1	1	1	1		
1	$1-3(1)^{1}$	5-10(6)	1-5(1)	2-4(2)	2-5(2)	2-4(4)	2-6(4)	1-5(2)			
2	2-3(2)	1	1	1	1	]	I	1			
3	1-2(1)	1	1	1	2-4(4)	2-6(3)	1-4(2)	1-6(2)	_		
4	2-6(2)	5-6(6)	7-11(7)	1-2(1)	1-2(1)	2-6(2)	1-6(2)	1-3(1)	1-3(1)		
5	2-6(5)	1-3(1)	1-2(1)	1-2(2)	1	1	1-3(1)	1-2(1)			
6	]	1	1	1	1	1	1-3(1)	2-4(2)	_		
7	1-2(1)	1-4(2)	2-5(3)	2-5(2)	2-4(2)	3-6(5)	1-6(3)	1-5(2)			
8	2-3(2)	_	2-8(4)	3-4(3)	1-3(1)	1-3(1)	1-2(1)	2-8(4)	_		
9	1-2(1)	1	1	1	1	1	1	3-5(3)	4-8(4,5)		
10	2-4(2)	1	1-4(1)	1-3(1)	1-3(1)	1-2(1)	1-3(2)	1-3(2)			
11	1-2(1)	_	1-2(1)	1-2(1)	1-2(1)	1-2(1)	1-2(1)	1-2(1)	_		
12	1-3(1)			_	_	_	_	_	_		
14	_	_	_	l	1	l	1	1-2(1)	1		

<sup>&</sup>lt;sup>1</sup> Range followed in parentheses by mode.

- mosquitoes of Middle America. Contributions of the American Entomological Institute (Ann Arbor) 1(2): 1–78.
- Darsie, R. E., Jr. and S. P. Pradhan. 1990. The mosquitoes of Nepal their identification, distribution and biology. Mosquito Systematics 22: 69–130.
- Darsie, R. F. Jr., S. P. Pradhan, and R. G. Vaidya. 1991. Notes on the mosquitoes of Nepal I. New country records and revised *Aedes* keys (Diptera, Culicidae). Mosquito Systematics 23: 39–45.
- ——. 1992. Notes on the mosquitoes of Nepal II. New species records from 1991 collections. Mosquito Systematics 24: 23–28.
- Darsie, R. E., Jr., G. W. Courtney, and S. P. Pradhan. 1993. Notes on the mosquitoes of Nepal III. Additional new records for 1992 (Diptera: Culicidae). Mosquito Systematics 25: 186–191.
- \_\_\_\_\_\_, 1994. The mosquitoes of Mustang (Diptera,

- Culicidae). Proceedings of the Entomological Society of Washington 96: 230–235.
- ——. 1996. Notes on the mosquitoes of Nepal IV. Results of the 1994 collecting in the Midwestern Region, including ne country records and voucher confirmation (Diptera, Culicidae). Journal of the American Mosquito Control Association 12: 130–134.
- Delfinado, M. D. 1966. The culicine mosquitoes of the Philippines, tribe Culicini (Diptera, Culicidae). Memoirs of the American Entomological Institute 7: 1–152.
- Ramalingam, S. 1987. On the restriction of *Armigeres durhami* Edwards and the description of *Armigeres kesseli* n. sp. (Diptera: Culicidae). Tropical Biomedicine 4: 55–65.
- Toma, T., I. Miyagi, and N. Benjaphong. 1994. Redescription of Armigeres (Armigeres) theobaldi (Diptera: Culicidae). Mosquito Systematics 26: 11–18.